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Report

Revving Up the Transition to Battery Electric Vehicles in Indonesia

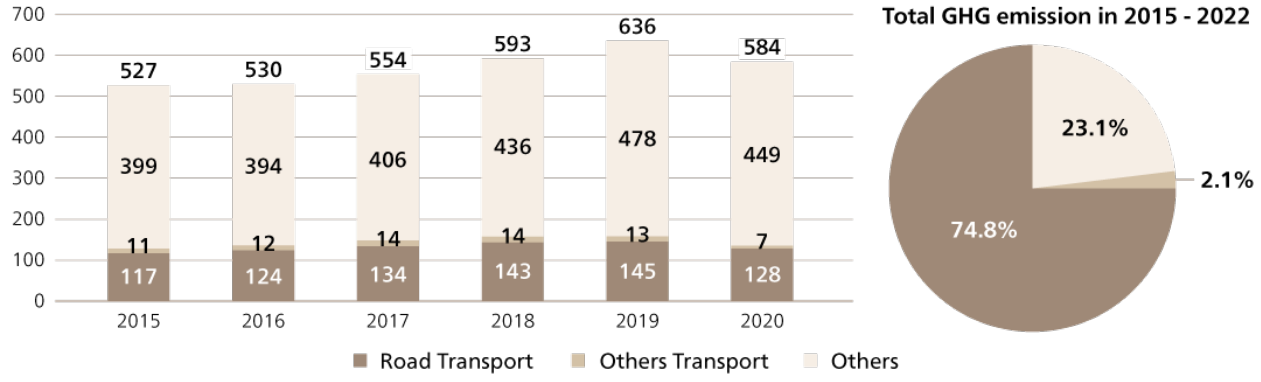
With Indonesia's rich natural resources, including a significant nickel supply crucial for EV batteries, the nation stands at a pivotal crossroads for accelerating the shift towards clean and sustainable mobility. We aim to analyze the intricate interplay of factors, such as government policies, private sector involvement, manufacturing challenges, market trends, and the imperative need for a robust EV charging infrastructure, all aimed at propelling Indonesia's journey towards a future dominated by Battery Electric Vehicles.

Importance of Reducing GHG Emissions from Road Transport in Indonesia

The Sustainable Development Goals (SDGs) are the global blueprint for fostering peace and prosperity for both present and future generations, addressing 17 critical issues, including climate action. All countries in Southeast Asia, collectively housing nearly 10% of the world's population, agreed to curb their emissions and released their respective plans.

In September 2022, the Indonesian government submitted its enhanced Nationally Determined Contribution (NDC) documents. In these documents, the government committed to reducing GHG emissions by 32% without international support, or 43% contingent on receiving international support, compared to the business-as-usual scenario by 2030. These new targets are slightly more ambitious than the plans submitted in 2021, which detailed 29% and 41% reductions in emissions, respectively[1]. To achieve the targets, the Indonesian government will need to implement measures that will transform sectors contributing significantly to GHG emissions.

Exhibit 1: Energy-related GHG emissions in Indonesia, Unit: Mt Co2e



Source: Ministry of Environment, 2022

The transportation sector ranks as the second-largest contributor to Indonesia's GHG emissions, trailing only behind the power sector and accounting for about a quarter of the country's total emissions. Since the year 2000, GHG emissions from transportation have surged by more than 120%. Road transportation was responsible for almost all of that growth. To combat growing emissions, the Ministry of Transportation has been

[1] https://climatepromise.undp.org/what-we-do/where-we-work/indonesia

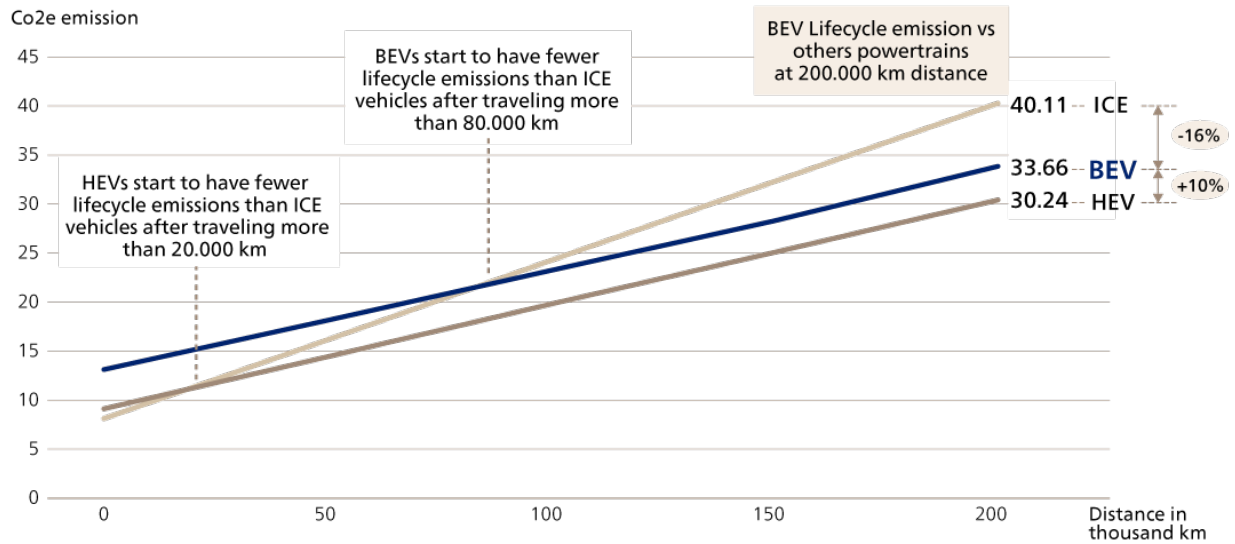
pursuing the "avoid, shift, and improve" framework. This framework aims to enhance efficiency by influencing consumer behavior through the development of Transit-Oriented Development (TOD) areas, optimization of public transportation, and advancement of technology used in the public transport[2]. Despite these efforts, public transport still plays a relatively small role in fulfilling the nation's transportation needs.

Electric Vehicles (EVs), particularly Battery Electric Vehicles (BEVs), are one of the key solutions to reduce GHG emissions from road transportation around the world. As long as we continue to rely on carbon-emitting fuels, using BEVs will not be carbon neutral. However, they can still lead to a reduction in GHG emissions in many countries. For example, in Thailand, our analysis revealed that using a BEV becomes more environmentally friendly, when considering manufacturing and vehicle use phases altogether, at about 50,000 km mileage when compared to an internal combustion engine (ICE) vehicle and at about 100,000 km mileage when compared to a hybrid vehicle.

However, Indonesia's reliance on coal-fired power plants (65% of the country's electricity is generated by burning coal) has led to one of the highest carbon intensities of electricity generation in the world. In fact, the trend has been concerning, as the proportion of electricity generated from coal has risen by 20 percentage points over the past decade.

As a result, BEVs may still yield lower GHG emissions when compared to ICE vehicles, exhibiting a lesser negative impact after covering a distance of 80,000 km, but this is generally not the case when compared to hybrid vehicles. Despite Indonesia's commitment to reducing GHG emissions, a substantial decline in carbon intensity seems unlikely by 2030. While Indonesia pledged to stop building new coal-fired power plants after 2023, there is no plan to decommission any meaningful share of existing plants soon. Therefore, in our view, the hybrid powertrain will likely remain the most environmentally friendly option in terms of GHG emissions in most scenarios until 2030.

Exhibit 2: Comparison of Lifecycle GHG emissions between different powertrains in Indonesia, Unit: Co2e tonnes, using a small crossover vehicle for comparison



Source: Tesla Impact Report, BP, Toyota and BYD websites, Abeam Consulting analysis

[2] https://iesr.or.id/strategi-dekarbonisasi-sektor-transportasi

Where BEVs have an advantage over both ICE vehicles and hybrid vehicles is in the realm of reducing oil imports. Indonesia is a net importer of oil and spent US$ 11.45 billion in 2022 for oil importation alone. The adoption of BEVs would help the government reduce its reliance on oil imports. Indonesia Battery Corporation, a state-owned enterprise engaged in the EV ecosystem, stated that by 2035, the adoption of 1 million electric cars and 12 million electric motorcycles could potentially curtail Indonesia's oil imports by around 23 million barrels in 2035 alone[3]. This would equal to approximately US$ 1.7 billion, based on global crude oil prices as of August 2023, or US$ 2.2 billion based on the Indonesia Crude Price (ICP).

Higher adoption of BEVs would undoubtedly deliver both fiscal and climate benefits to Indonesia when compared with ICE vehicles. Despite that, the current adoption of BEVs in Indonesia is still very limited due to a number of existing challenges. Those challenges, however, can be overcome. For those interested in capitalizing on this growth opportunity, it is important to understand what the challenges are and devise strategies to address them.

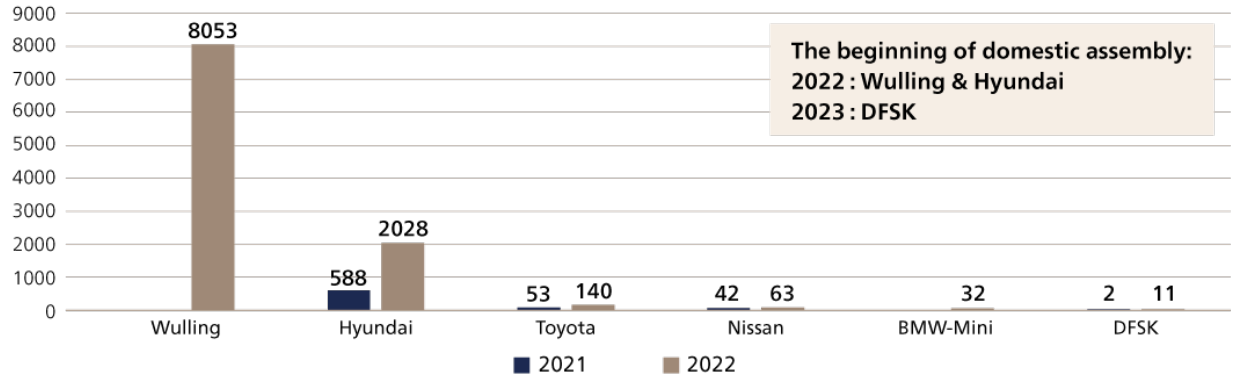
Current BEV Adoption in Indonesia

Globally, the light vehicle market witnessed a modest 5% growth in 2022 when compared to the previous year. In contrast, the BEV sales increased by 55%, accounting for 14% of all light vehicle sales. This was a significant leap from the 9% achieved in 2021 and a modest 5% market share recorded in 2020. However, the adoption of BEVs in terms of market penetration in Southeast Asia remained limited, accounting for approximately 2% of total sales in 2022. Within Indonesia, ranked as the 14th largest automotive market worldwide, the market share of BEVs was even more modest at just 1%. This positioned Indonesia behind countries such as Singapore (with a 12% market share) and Thailand (with a 1.2% market share) in terms of BEV adoption rates.

However, Indonesia's BEV sales have been experiencing rapid acceleration. In 2022, Gaikindo reported that the sales grew by over 1,400% (equivalent to 15 times) compared with 2021. A significant change took place in the span of a year: from having only five BEV models available in 2021, Indonesia saw this number expand to nine in 2022. It is important to acknowledge that, although this growth is impressive, it remains a notably small figure when compared to the vast array of over 150 Internal Combustion Engine (ICE) models accessible within the Indonesian market. The affordability of BEVs has also improved, with the most economical BEV model now priced at approximately IDR 250 million (equivalent to approximately US$ 16,500) due to the introduction of Wuling Air.

[3] https://www.cnbcindonesia.com/news/20230215195234-4-414145/mobil-listrik-ngaspal-ri-bisa-tekan-impor-bbm-23-juta-barel

Exhibit 3: BEV sales by brand in Indonesia, Unit: volume sold



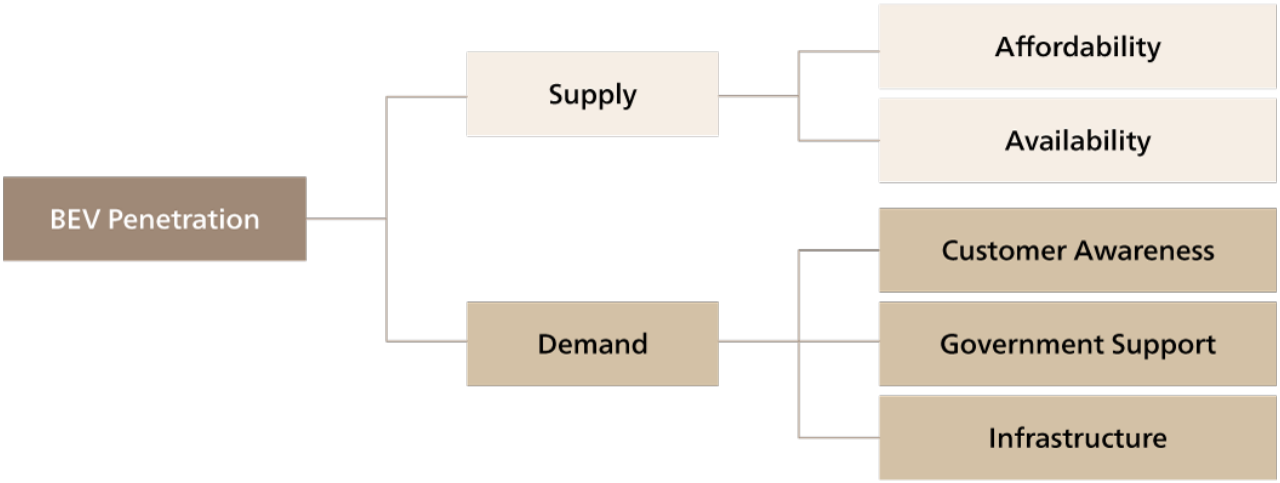
Source: Gaikindo, 2023

Beyond the introduction of new BEV models, EV charging infrastructure also improved. As of December 2022, Indonesia had around 800 charging ports that were distributed across more than 500 locations. PLN – a state-owned electric utility company manages about 70% EV charging ports in Indonesia.

Key Enablers to Increase BEV Penetration

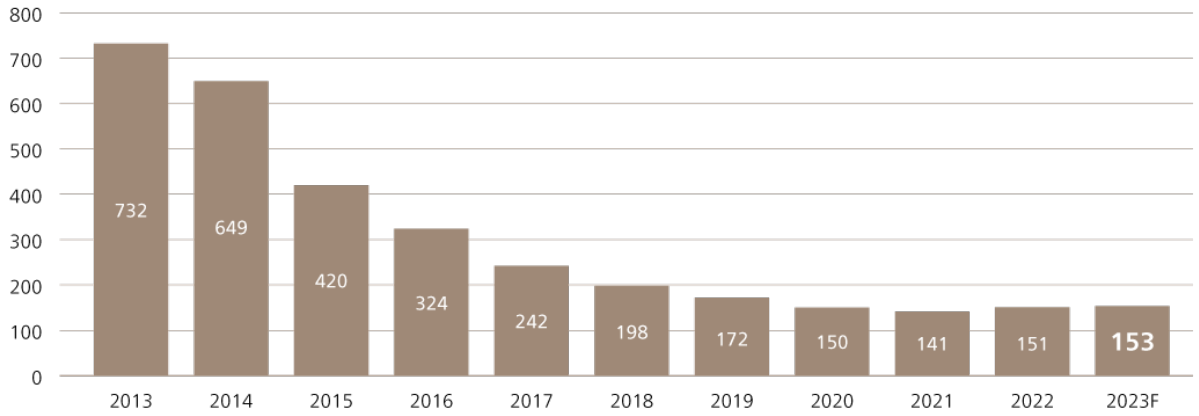
Boosting BEV adoption requires addressing both supply and demand factors. We define supply factors as those that are related to activities before vehicles reach the retail channel, while demand factors are related to the customer perception about the experience of using a BEV.

Exhibit 4: Dissecting key factors behind BEV adoptions



Improving the supply of BEVs hinges on two primary factors: affordability and availability. Three essential elements contribute to making BEVs more economically accessible: technological advancements leading to reduced battery production costs, government incentives, and economies of scale. Globally, over the past decade, BEV prices have consistently decreased in tandem with declining battery prices. However, in 2022, battery prices experienced a slight increase due to disruptions in the supply of raw materials. Assuming no significant future supply issues that might escalate raw material costs, we anticipate a decline in battery prices after 2023 which should lead translate into lower manufacturing costs of BEVs.

Exhibit 5: Lithium – Ion battery pack cost worldwide, Unit: US$ per kWh



Source: BloombergNEF, 2023

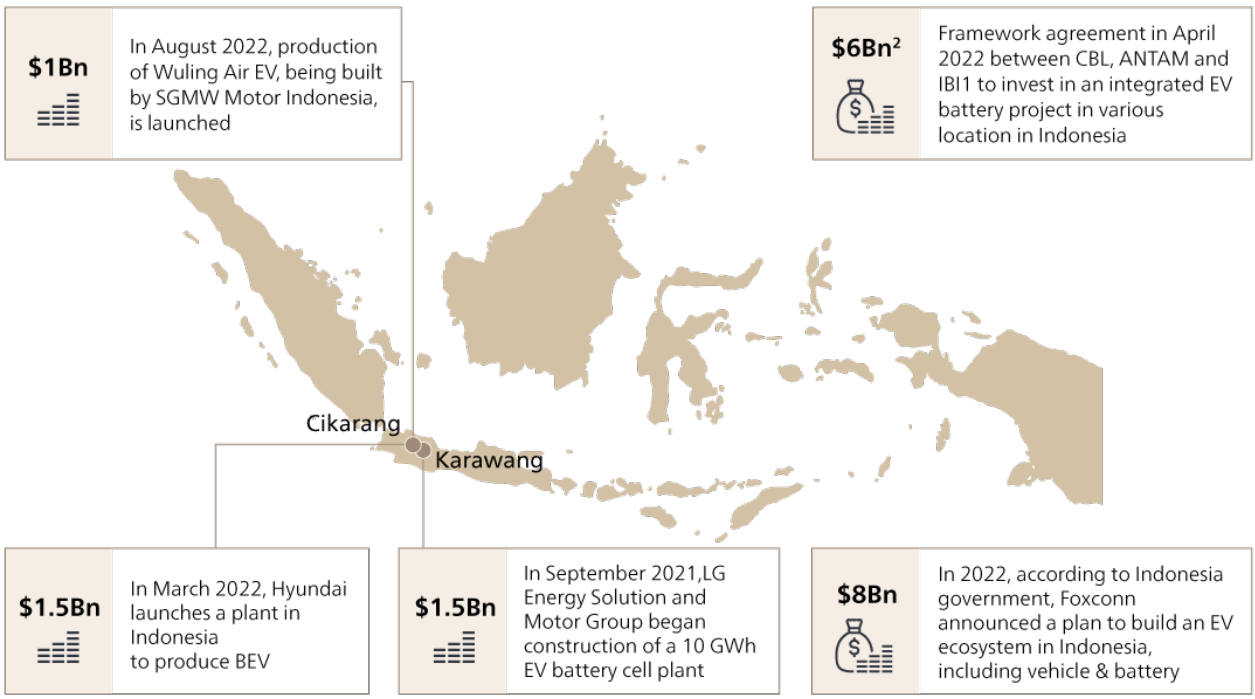
Economies of scale play a crucial role in boosting the penetration of BEVs. By increasing production volumes, economies of scale enable cost reductions in manufacturing, leading to lower prices. This is one of the key reasons why many BEVs manufactured in China are produced at lower costs than comparable vehicles in other parts of the world.

Government support is another critical factor. In this regard, the Indonesian government now supports the market by reducing BEV prices through its tax subsidy policy. Starting in April 2023, the Indonesian government implemented a subsidy on value-added tax (VAT) through Regulation of Ministry of Finance No. 38 of 2023, reducing VAT from 11% to 1% for BEVs that consist of at least 40% from locally sourced components. This incentive helped decrease four-wheeled BEV prices by between IDR 20 million (US$ 1,400) and IDR 70 million (US$ 4,700). Additionally, in May 2023 the government introduced Regulation of the Ministry of Home Affairs No. 6 of 2023, offering a 0% rate for BEV annual tax and transfer title tax. There are also manufacturing incentives such as corporate income tax holidays of up to 20 years, VAT exemption on nickel, and no import tax on machinery, among others. Overall, these incentives have resulted in some positive outcomes as PT SGMW Motors Indonesia (Wuling Indonesia) and PT Hyundai Motor Indonesia have begun the domestic assembly of BEVs.

The second key factor in increasing BEV supply is the availability of BEVs for purchase. In 2022, as BEVs consume more semiconductors compared to ICE vehicles, the global supply shortage of semiconductors became a challenge to producing enough BEVs. In addition, in Indonesia in particular, there are still very few brands and models available to customers, making it difficult to find desired vehicles. Throughout the world, nearly 500 BEV models were available in 2022. In Singapore there were over 30 models while Thailand had 22 models available for purchase. At the same time, Indonesians could choose only among nine BEV models. However, the Indonesian market is poised to introduce eight new BEV models and three new brands in 2023. As the market sees an influx of new models and brands, the broader BEV ecosystem, encompassing the extended supply chain, is anticipated to expand thanks to investments from both local and foreign enterprises.

Since 2021, multiple companies pled to invest billions of dollars in BEV manufacturing and the broader supply chain. As investments flow into the country, we should begin to see a more significant production capacities being available from 2025 onward.

Exhibit 6: Selected investments in the BEV ecosystem in Indonesia



1 CBL – Ningbo Contemporary Brunp Lygen Co., Ltd. (subsidiary of CATL), ANTAM – PT. Aneka Tambang, IBI – PT. Industri Baterai Indonesia
2 Including investment in nickel mining and processing

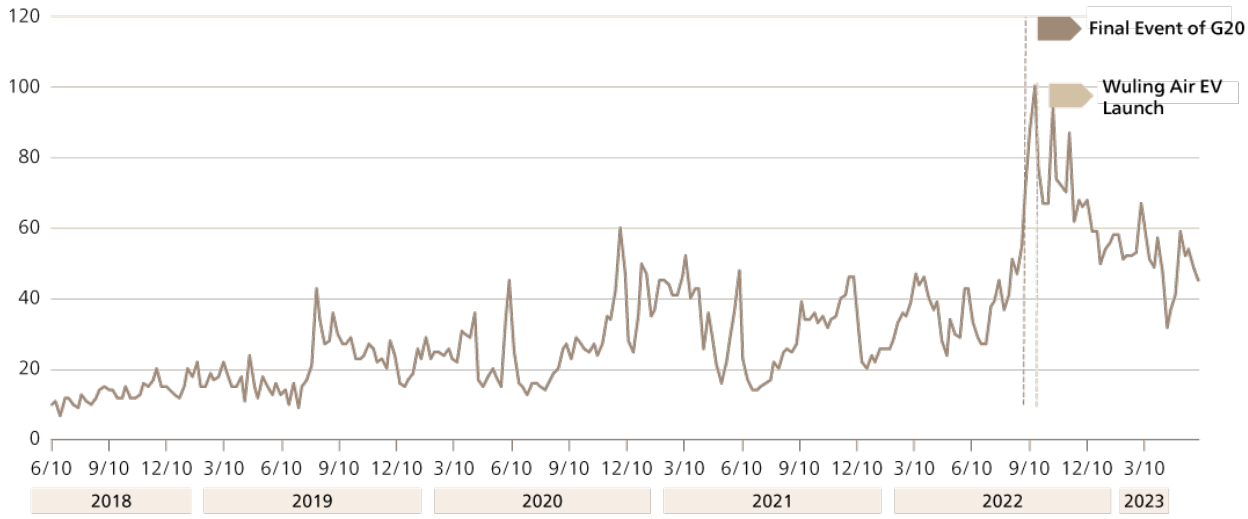
Source: Press, Katadatabooks
Illustrations were created by ABeam Consulting based on information from the sources.

Looking from the demand perspective, we believe that there are three key factors impacting BEV adoption: customer awareness, government support, and EV charging infrastructure. The recognition and comprehension of EV technology among customers have witnessed growth; Google Trends reported a four-fold surge in online searches related to EVs over the past five years in Indonesia. This upswing in searches occurred particularly at the close of 2022, coinciding with two events: the G20 event held in Bali, where over 1,400 BEVs were made available to attendees, and the launch of the Wuling Air EV. Stakeholders in the automotive sector, such as Periklindo (The Association of Indonesia Electric Vehicle Industry), are also contributing to the amplification of awareness. Since 2022, they have organized the Periklindo Electric Vehicle Show (PEVS), functioning as a platform for community engagement and education, while concurrently fostering collaboration among stakeholders. Various automotive brands use the event to introduce their most recent products and highlight the advantages associated with BEVs. Consequently, the acceptance of BEVs is steadily growing. Based on the ABeam Consulting survey conducted in April 2023, we found that 35% of Indonesians intending to buy a new car would consider buying a BEV[4].

[4] "Gen Z and the Future of Car Buying" https://www.abeam.com/th/en/about/insight/20230522_2

Exhibit 7: Google Trend of "mobil listrik" ("electric vehicle") keyword.

Numbers represent search interest relative to the highest point on the chart for the given region and time



Source: Google Trends
"Gen Z and the Future of Car Buying" https://www.abeam.com/th/en/about/insight/20230522_2

The government provides a range of non-financial measures to boost demand for BEVs. According to Regulation No. 164 of 2016, issued by the Governor of Jakarta, the city has implemented an odd-even license plate policy to manage traffic in the city during peak hours on normal working days by limiting access of personal four-wheeled vehicles to specific roads. To support the adoption of BEV, Jakarta's local government letter has issued Government Regulation No. 88 of 2019 exempting BEVs from the odd-even license plate restriction. Moreover, the Indonesian government actively encourages shopping malls to allocate dedicated parking spaces equipped with EV charging stations.

EV infrastructure development also has major impact on BEV demand. The government, through the state-owned electric power distribution company PLN, gives support to EV charging point operators by providing retail rate incentives, discounts on installment fees, and waiving subscription fees. The government also offers its support to private customers who wish to install home charging stations on their residential properties by offering preferential pricing for installation and discounts on electricity bills[5].

Actions to Accelerate BEV Adoption

Indonesia is rich in natural resources like nickel, a critical component in nickel manganese cobalt oxide (NMC) batteries which accounted for 60% of EV batteries produced globally in 2022[6]. Additionally, Indonesian market

[5] Ministry of Energy and Mineral Resources of Republic Indonesia's press conference, Jakarta, Jan 4th, 2022

[6] https://www.iea.org/reports/global-ev-outlook-2023/trends-in-batteries

is expected to continue to expand with growing population and economy. Therefore, Indonesia has large potential to be an important market and producer of BEVs in the future.

However, there is still a long journey for Indonesia towards the transition to clean mobility in a significant way. First and foremost, the carbon intensity of electricity generation needs to be reduced. Secondly, the market and industry conditions have a lot of room to improve. Thus, we share possible actions for various stakeholders to consider to help accelerate the adoption of BEVs in the country.

Manufacturing:

Government incentives will play a pivotal role in driving the development of BEV manufacturing and the component supply chain in Indonesia. Although the country introduced incentives in 2023, they are linked to a substantial 40% local content requirement and are valid only until the end of this year. This timeline is problematic for the manufacturers of four-wheeled vehicles to capitalize on the incentives in time, as establishing BEV and component factories demands significant time.

While there is a growing interest in BEVs among Indonesians, there remains uncertainty regarding the demand for BEVs. A more appropriate approach to fostering the industry's growth may involve encouraging higher market adoption in the short term, regardless of the origin of BEV manufacturing. For example, in 2022, Thailand introduced a policy, which allowed BEV makers to import vehicles from other countries and receive substantial incentives in return for committing to domestic manufacturing by 2025. This move was critical in helping increase BEV sales, quickly growing to a 7% market share in some months of 2023, while a number of players have already started constructing assembly plants. Implementing similar government policies in Indonesia could be a good approach. The government could boost domestic market growth through attractively priced imported vehicles. With a higher market demand, local manufacturers would be more motivated to transition to BEVs.

In addition to incentives related directly to selling and assembling BEVs, Indonesia needs clear policies aimed at attracting investment in the manufacturing of BEV components. Automotive suppliers should proactively work on building the local supply chain, as the shift to BEVs will reshape the competitive landscape and will attract new companies from abroad. Those players will often require local partners to support investments. Local companies, particularly those currently focused on supplying ICE components, must actively build relevant relationships and gain a comprehensive understanding of opportunities available to support the transition to e-mobility, as it may be a pivotal activity to remain relevant within the evolving market.

Distribution and Sales:

Effective marketing and sales strategies are critical to increase the adoption of BEVs. BEVs possess unique characteristics, such as their quiet operation, superior acceleration, and lower operating costs. Additionally, BEVs are more environmentally friendly than ICE vehicles. However, common concerns related to battery

degradation, poor resale values, damage to batteries due to road accidents or floods, and the lack of public charging infrastructure may deter potential customers.

BEV distributors must therefore prioritize customer education to enhance product confidence. Mitigating risks associated with BEV ownership, such as offering robust warranty programs or ensuring that sales advisors are well-informed and have real-world data (from Indonesia or abroad) for potential buyers related to all critical aspects of vehicle ownership, is essential. With the growing influence of online channels on customer purchasing decisions, a single negative experience from a customer can have an exponential impact. Therefore, it is crucial for distributors to deliver a high-quality product and customer experience from the very beginning, particularly for new players looking to establish a positive reputation for their brand in the country.

Anticipating market trends and potential issues is vital for distributors. For example, a distributor of BEVs in Thailand struggled to provide enough spare parts to service centers, which significantly increased the time needed to repair damaged vehicles. While not everything can be predicted all the time, especially in the new industry, more planning and deploying the latest IT systems can help mitigate operational problems.

EV Charging:

A robust EV charging infrastructure is a cornerstone of the widespread adoption of BEVs. Government support is essential to facilitate the development of this critical aspect of the ecosystem. Incentives for charging station operators can encourage the establishment of businesses that are commercially sustainable. However, beyond incentives, the government must also make investments in the transmission and grid infrastructure to accommodate the growing demand for EV chargers. The government should also actively work to develop processes that efficiently link new EV charging stations of private companies with the national power grid. In large metropolitan areas, regulations mandating new real estate developments such as high-rise condominiums to incorporate the necessary infrastructure for EV charging would help ensure convenient charging experience.

Conclusion

The growth of BEV adoption in Indonesia hinges on strategic approaches to manufacturing, distribution and sales, and the development of a robust EV charging infrastructure. Government incentives and clear policies are vital for promoting the manufacturing of BEVs and relevant components. But, arguably, there is an even greater role for private players to play. They must ensure that they have enough knowledge and other resources to maximize the opportunities that lie ahead of them for the next decades to come.